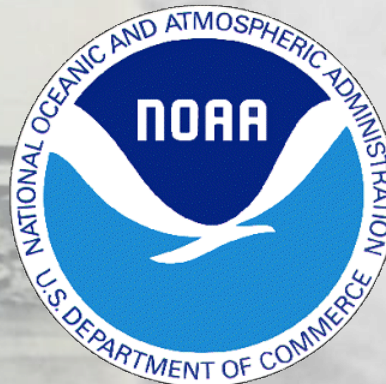


# **Hurricane History of the Rio Grande Valley, Texas**

**Will Past Stories Prevent a  
Future Human Catastrophe?**

**Barry Goldsmith**

**NWS Brownsville/Rio Grande Valley**



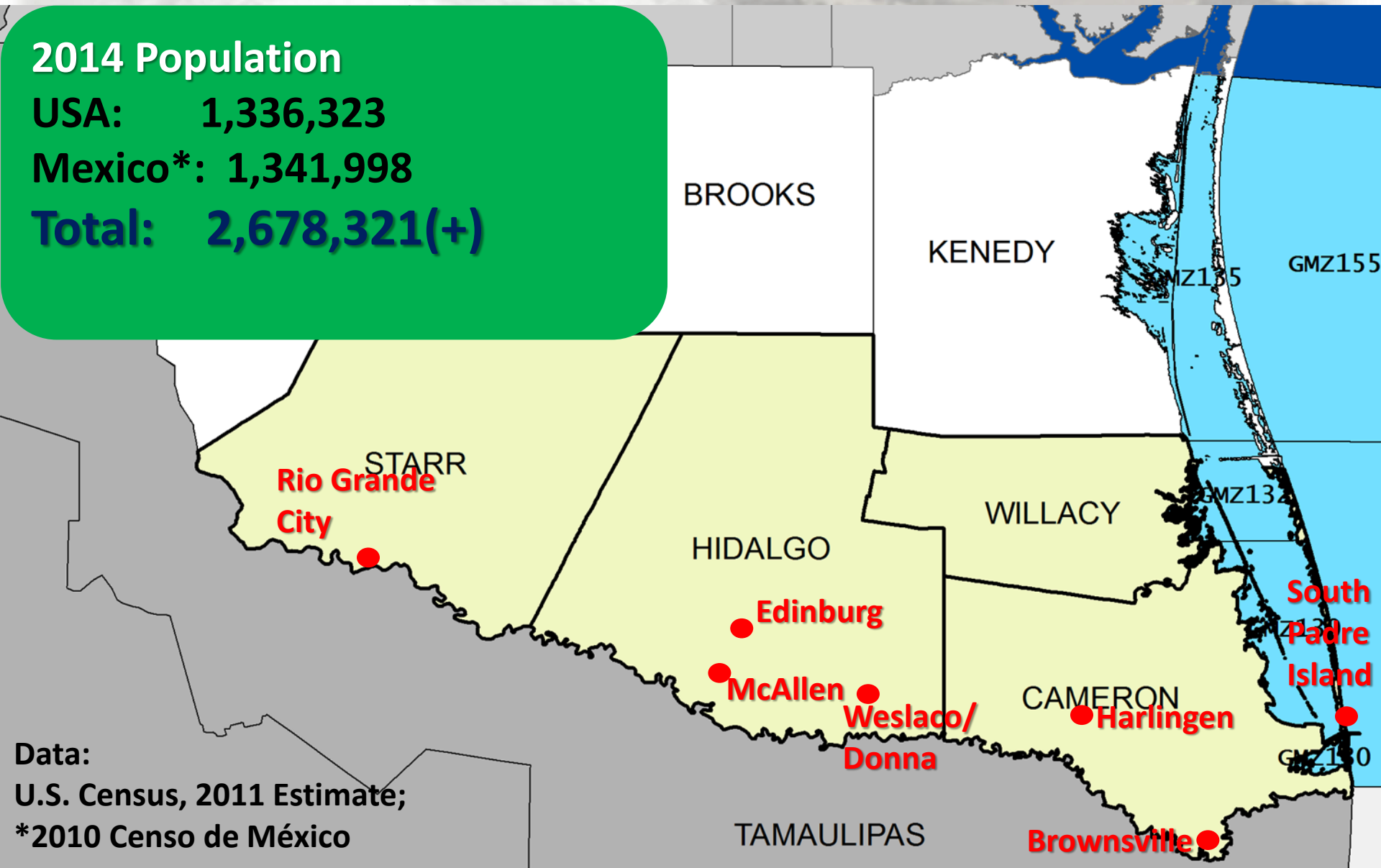
# What is the Rio Grande Valley?

## 2014 Population

USA: 1,336,323

Mexico\*: 1,341,998

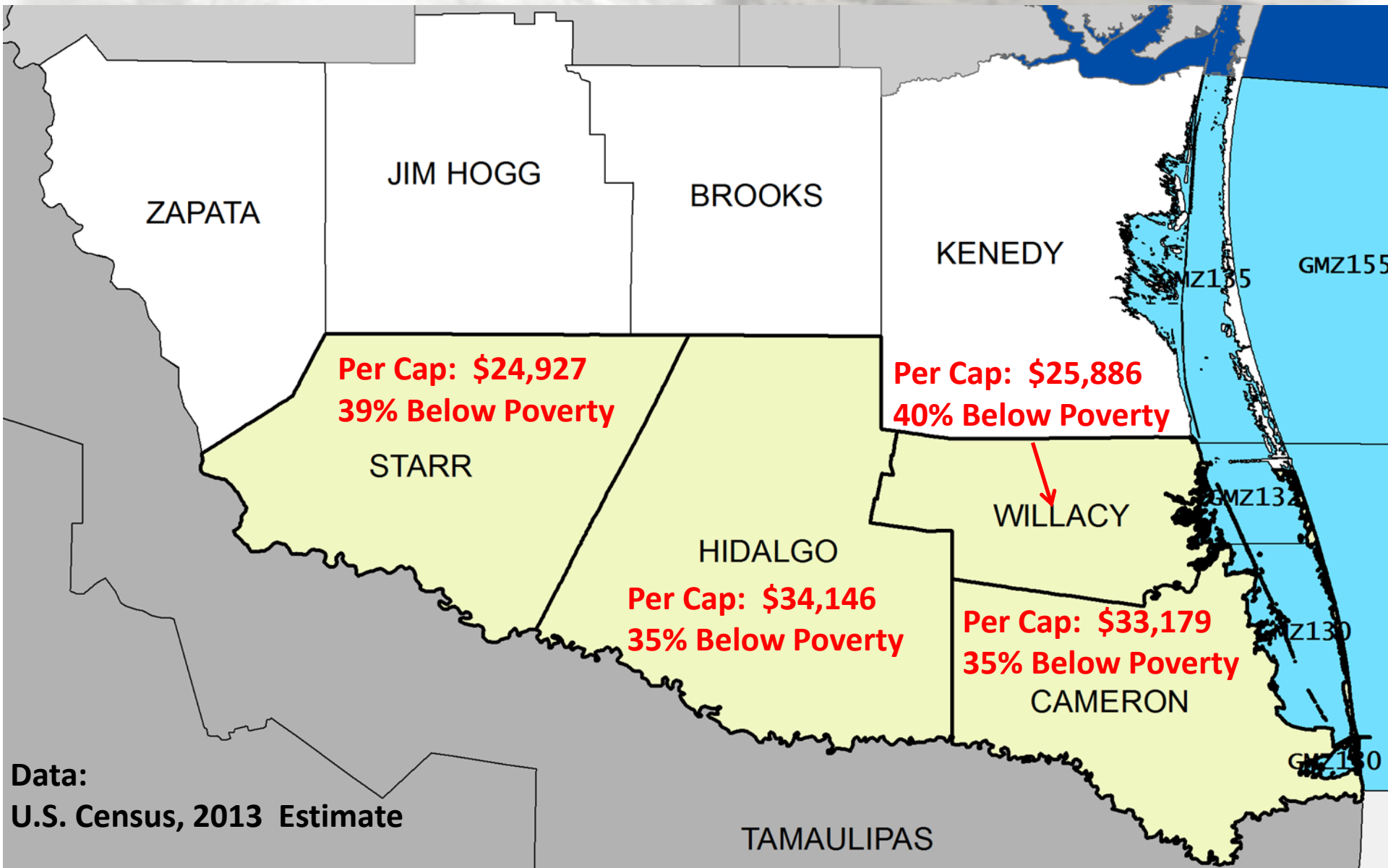
**Total: 2,678,321(+)**



Data:  
U.S. Census, 2011 Estimate;  
\*2010 Censo de México

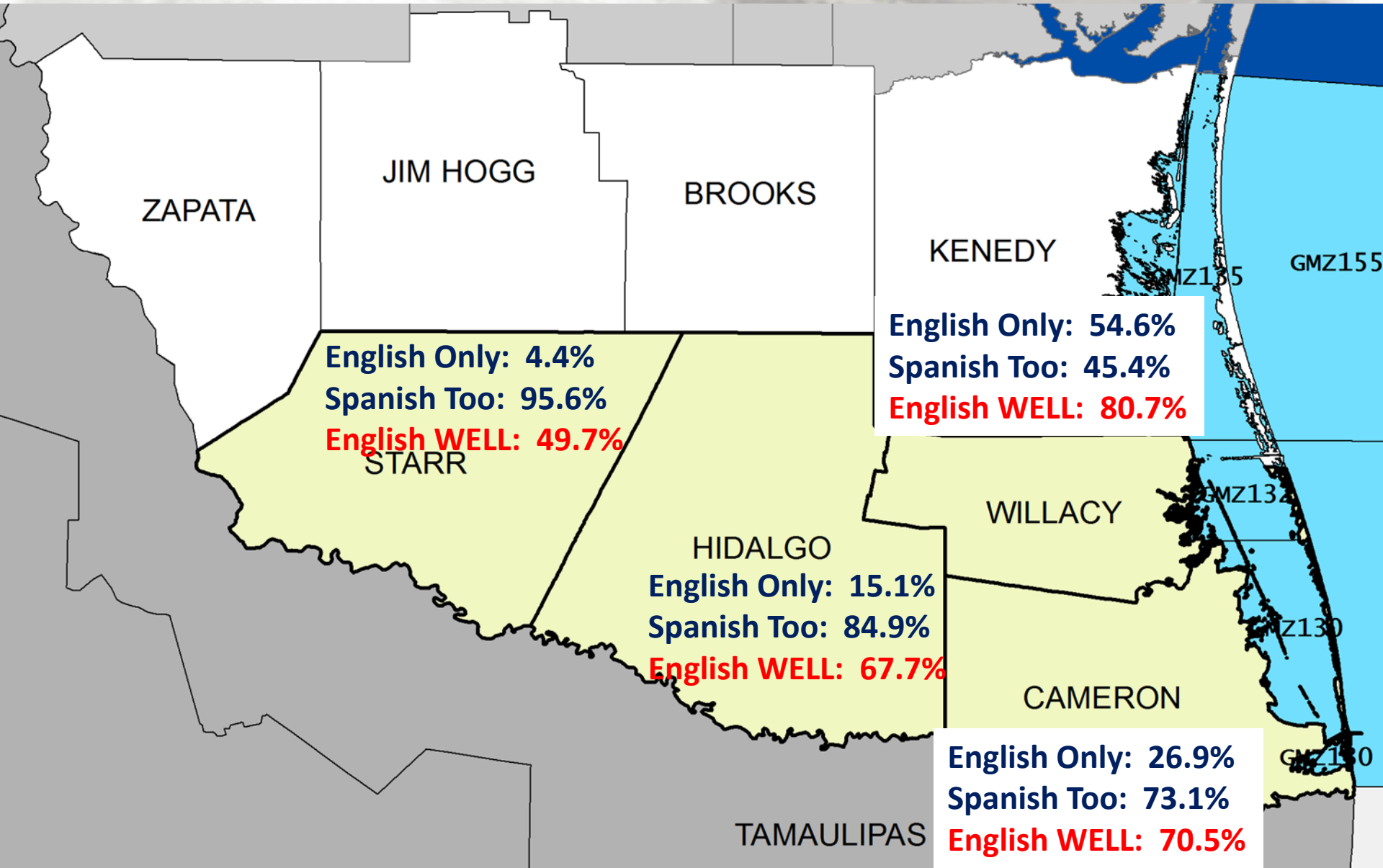
# Potential Vulnerabilities

Per Capita Income/Percent Below Poverty Level



# Language Matters

## Who Speaks What?

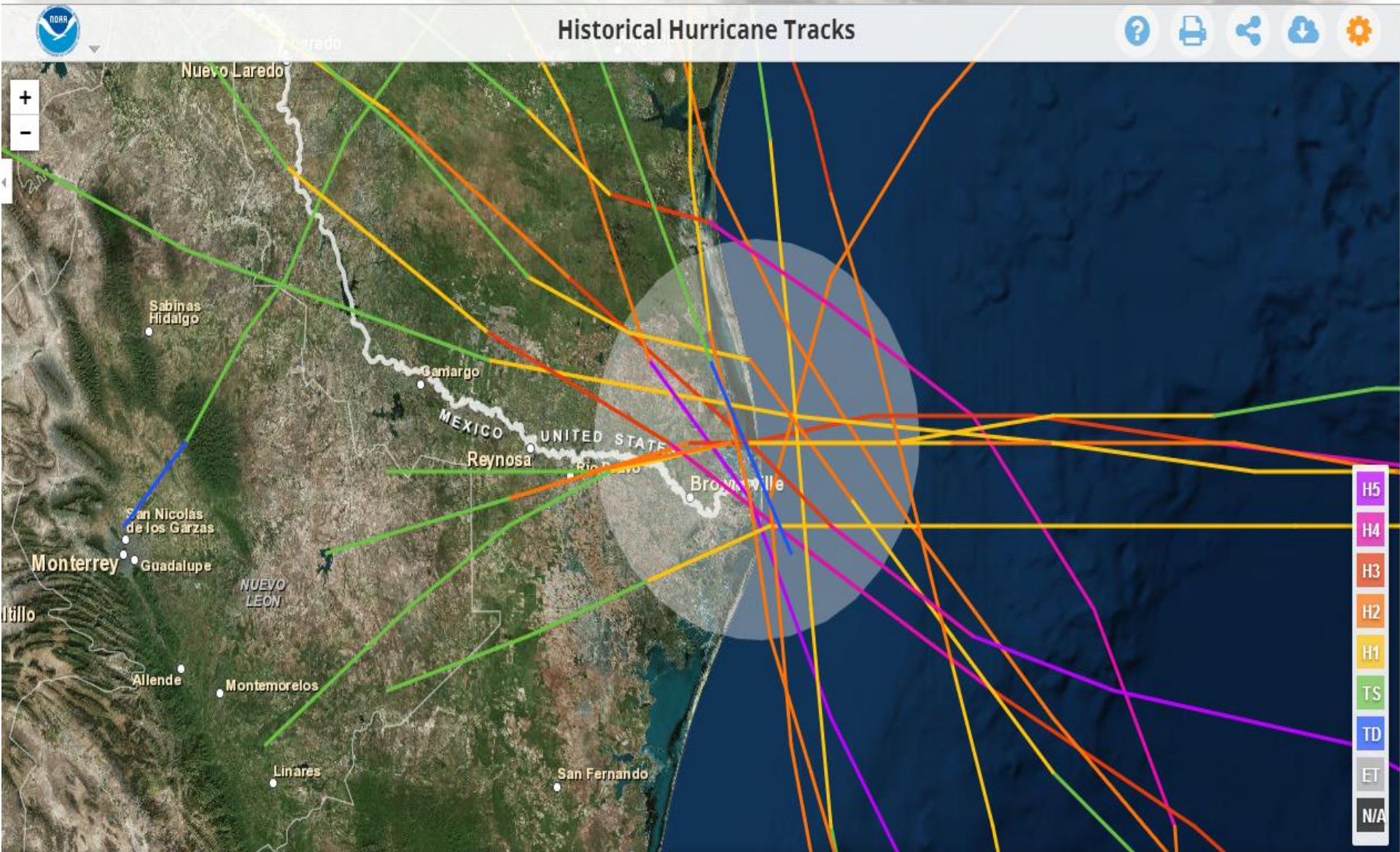




# **Significant Land Falling Hurricanes in/near Rio Grande Valley since 1800**

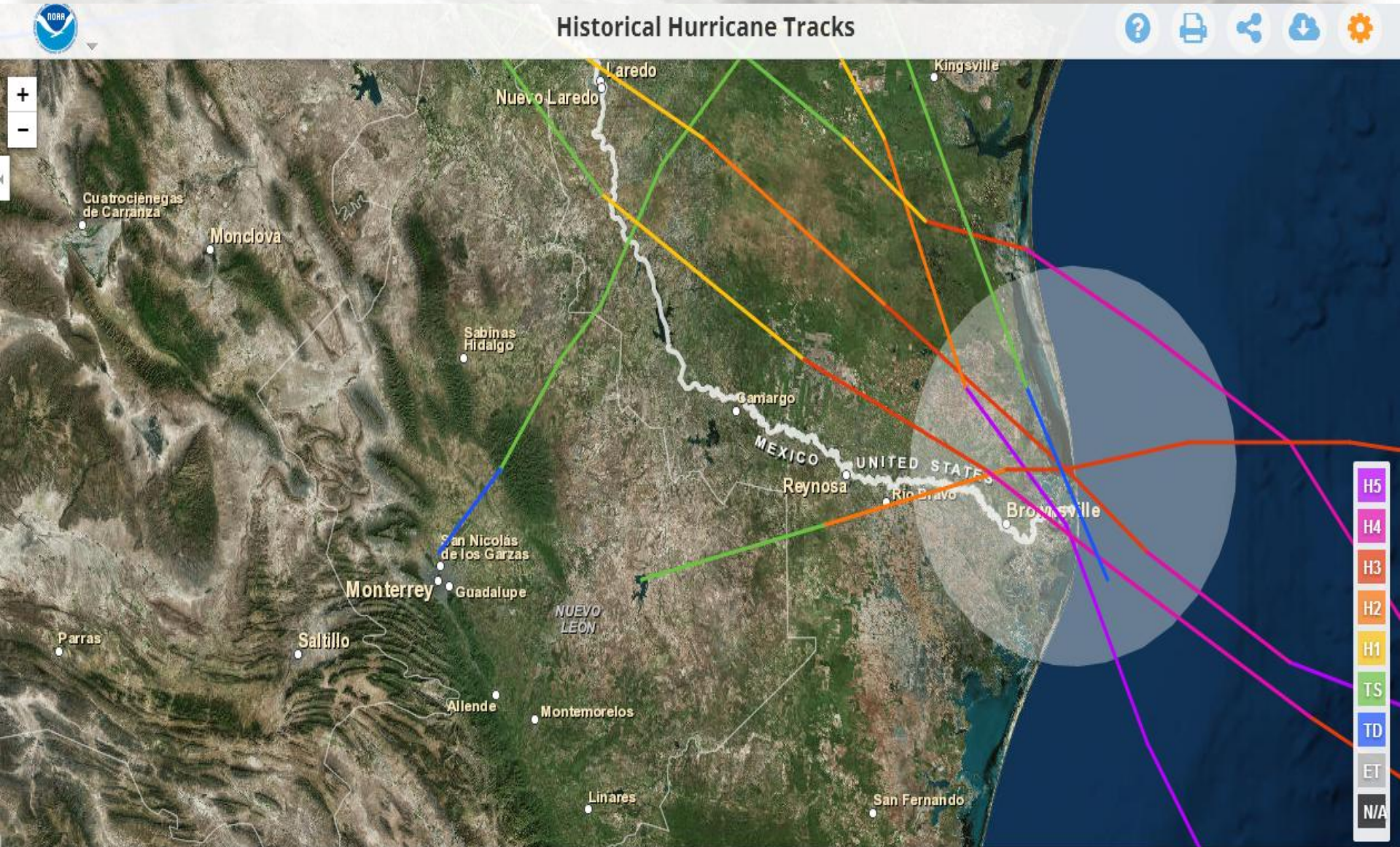
- **1837 – “Racer’s” Storm**
- **1867 – Brownsville**
- **1880 - Brownsville**
- 1886 – Brownsville
- 1895 – Brownsville
- 1909 – Brownsville
- 1916 – Port Mansfield
- 1933 – Brownsville (1)
- **1933 – Brownsville (2)**
- **1967 – Beulah**
- **1980 – Allen**
- 1988 – Gilbert
- 2005 – Emily
- **2008 – Dolly**
- **2010 - Alex**

# Landfalling Hurricanes Along Texas/Mexico Border (since 1850)





# Category 3 or Higher Hurricane (Wind Only) Along Texas/Mexico Border (since 1850)



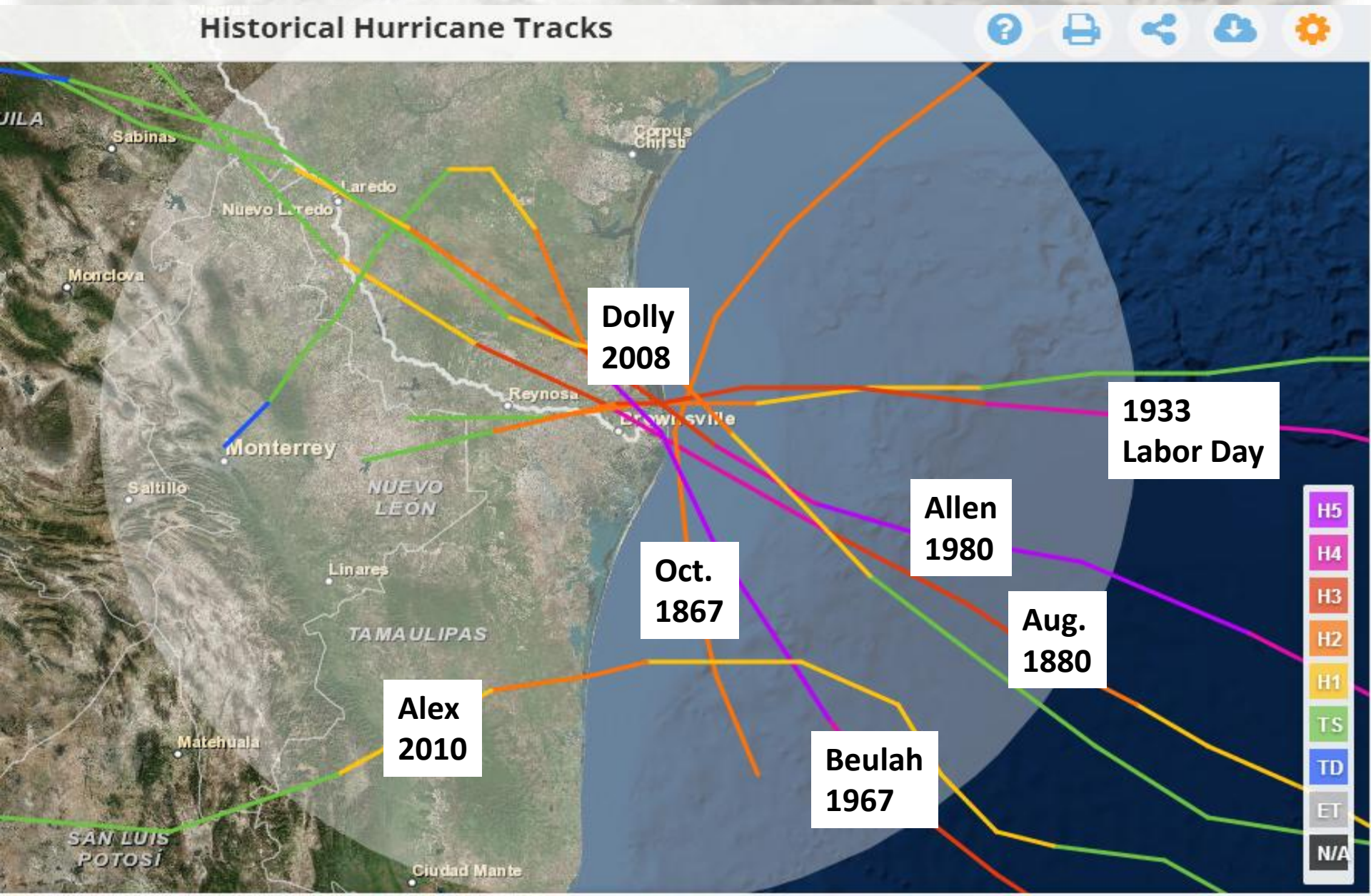


# Teaser Alert: More to the Story...



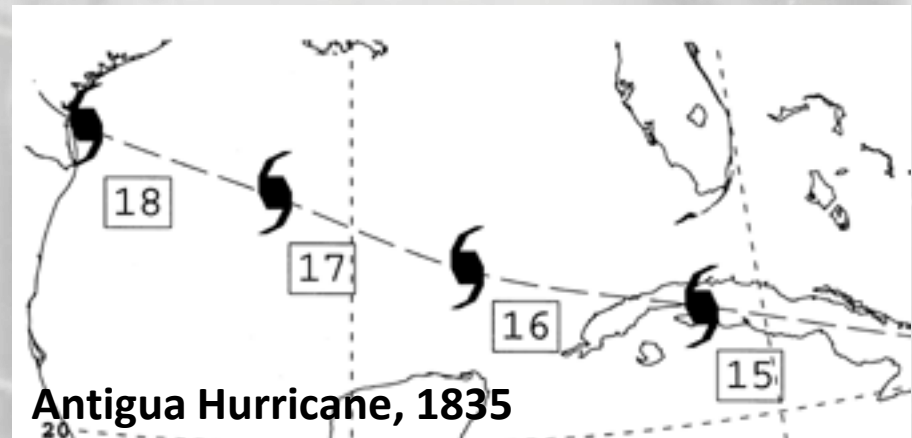


# Some Hurricanes Discussed Today...



# The Early 19<sup>th</sup> Century

- September, 1829
  - Total inundation of Point Isabel (now Port Isabel)
  - Widespread Flooding of “The Valley” (unknown how far inland this was)
  - Soccoro Mission Washed Away; Had Survived since 1691
- August, 1835 “Antigua” Hurricane
  - Landfall Near Mouth of Rio Grande (Again)
  - Villa Hermosa de Santa Anna Destroyed
  - Vessels in Brazos de Santiago Swept into Gulf



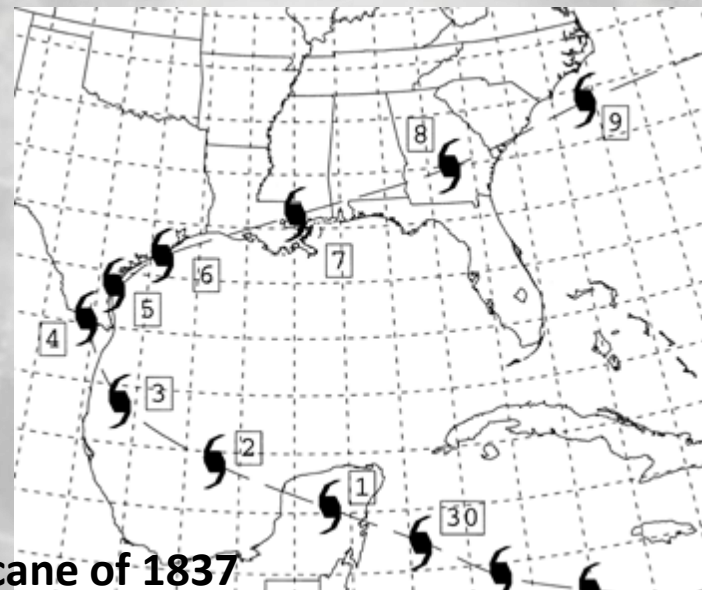
Antigua Hurricane, 1835



# Racer's Storm: October 1837



- Named for HMS “Racer”, which was heavily damaged intercepting the hurricane near Belize
- Worst “Compound” Storm in Lower RGV History?
- Only one other Significant October Storm in History (1867) for Region

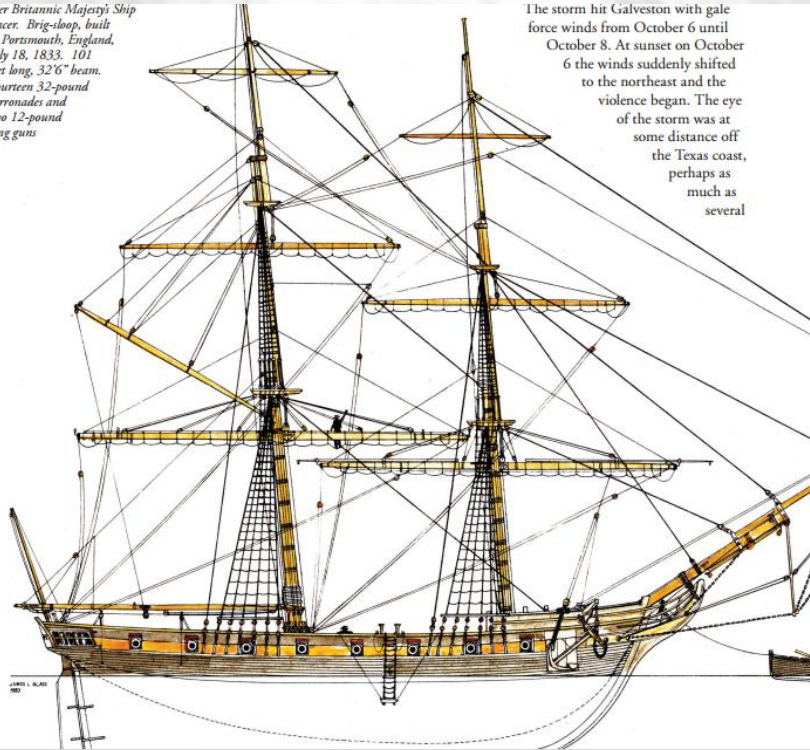




# Racer's Storm: October 1837

*Her Britannic Majesty's Ship Racer, Brig-loop, built at Portsmouth, England, July 18, 1833. 101 feet long, 32'6" beam. Fourteen 32-pound carronades and two 12-pound long guns*

The storm hit Galveston with gale force winds from October 6 until October 8. At sunset on October 6 the winds suddenly shifted to the northeast and the violence began. The eye of the storm was at some distance off the Texas coast, perhaps as much as several

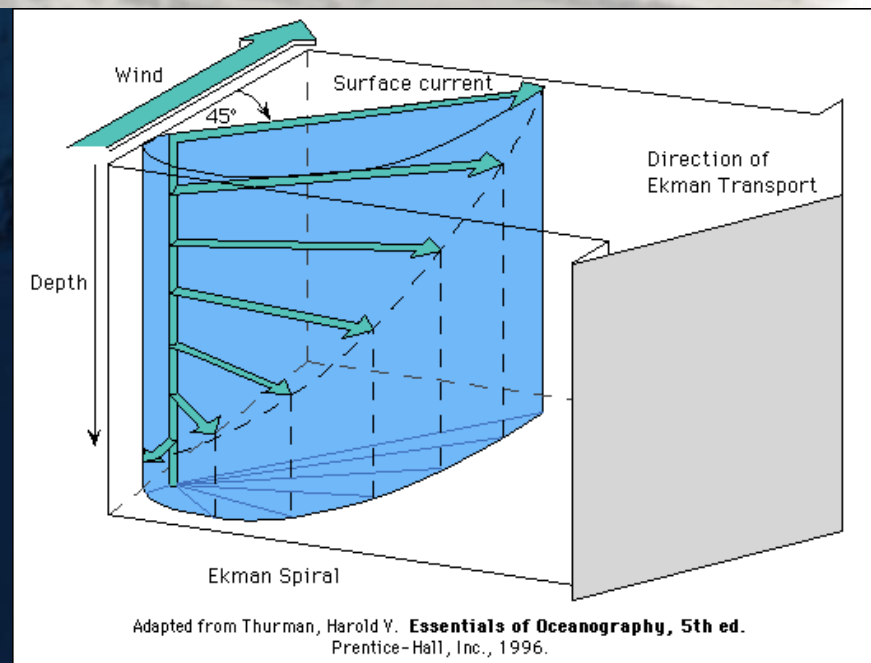


- “Dr.” Louis Berlandier, Botanist and “Meteorologist” of Matamoros
  - Records provided to US Navy, Smithsonian
- Worst-Case Scenario Setup:
  - **Pre-storm flooding/inundation from heavy summer rain (crops lost)**
  - **9” in late September, followed by 29”+ from Hurricane**
    - Storm nearly stalled for ~72 hours in Brazos de Santiago/Matamoros Region
  - Destructive Storm Surge Exacerbated Flooding in Matamoros; Wiped out Brazos de Santiago.
  - 35 souls lost on the schooner *Velasco*, pummeled at Santiago. 105 total in Tex-Mex.

From Glass, 2008: Racer's Storm, Benchmark Hurricane of 1837



# 1867 Matamoros/Bagdad/Brazos Hurricane (also in October!)



- Matamoros/Santiago Fleet Crippled
- Dozens Killed, Hundreds(?) Injured, Thousands Lost Everything in Bagdad/Brazos/Matamoros
- Hurricane was a “pure ‘Norther” (above left) which likely contributed to devastating surge due to Ekman Forces (above right). Persistent 90-100 mph winds drove the water in.

From New York Times, Nov. 1867

# August 1880: Brownsville's (First) Big Blow

- Matamoros nearly “wiped out” by wind, rain
- Brownsville: Nearly 8” of rain a daily record
- Five dead, unknown number of injuries in/near Brownsville

## Search Hurricanes By

Location	Name/Year	Ocean Basin
Brownsville, TX, USA	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

100

Nautical Miles

☒ Show search area

## Refine Search

Search through the storms below

☒ Results (4)

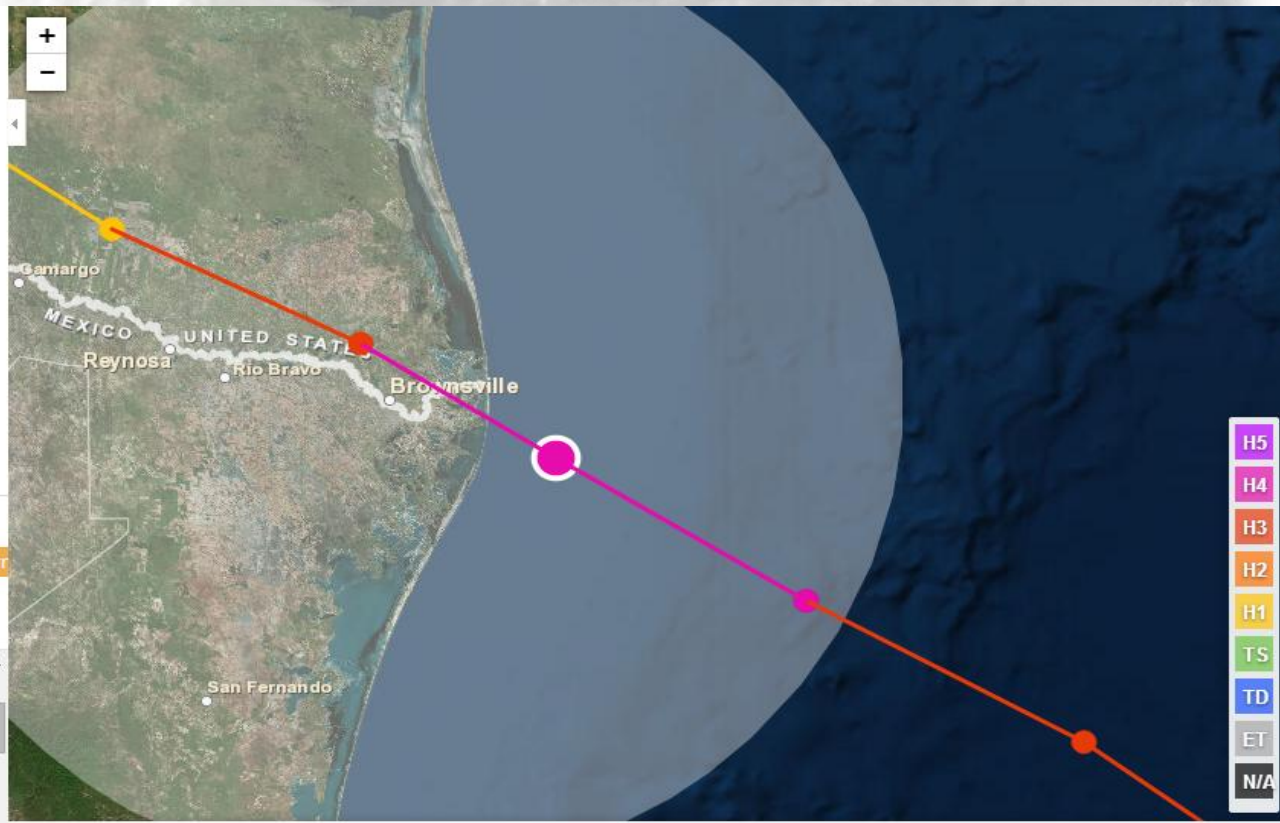
☐ Selected

☐ My Storms (8)

## NOT NAMED 1880

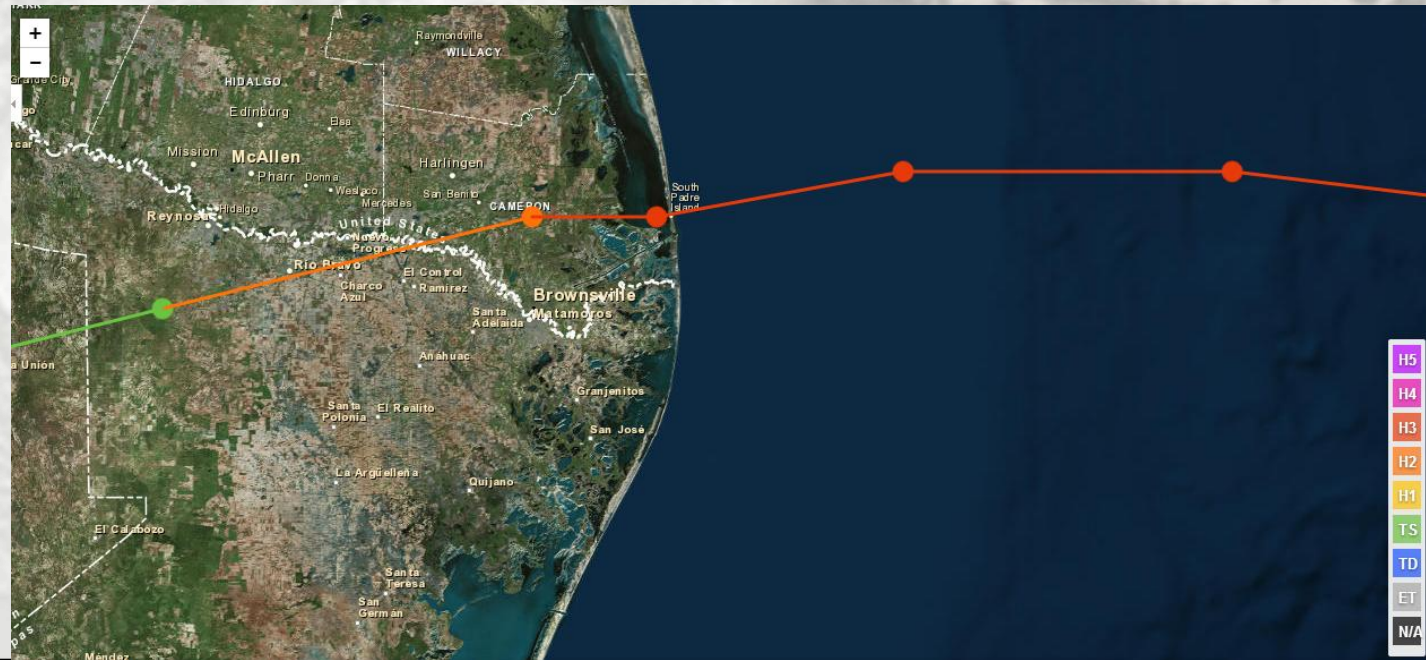
(43 Advisories)

Aug. 13, 1880 0z	931	130	H4
Aug. 13, 1880 06z	943	110	H3
Aug. 13, 1880 12z	0	70	H1





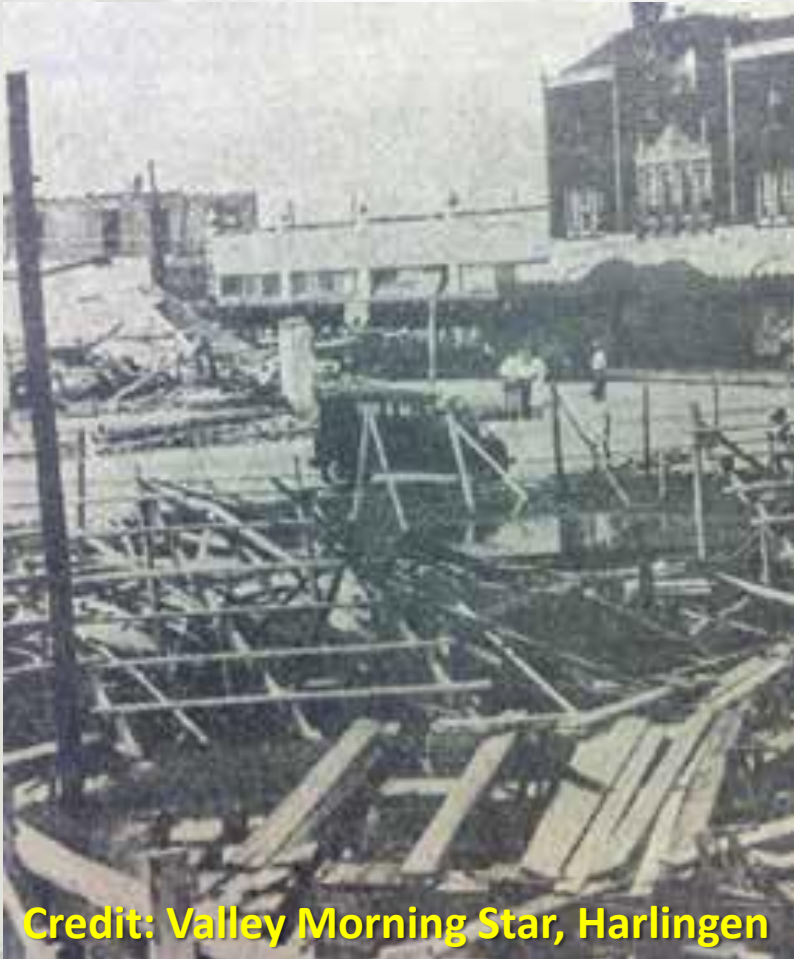
# 20<sup>th</sup> Century: 1933 Labor Day Storm



Credit: Brownsville Herald



# 20<sup>th</sup> Century: 1933 Labor Day Storm



- Another “Worse Case” Scenario: Perpendicular Hit, Strengthening Prior to Landfall, Steady Movement
- 40 killed, hundreds injured, peak gusts 125 as far inland as Harlingen (left)
- 13’ storm tide (Port Isabel); inundation “into Brownsville”
- 18” of rain in Harlingen
- Up to \$60 million damaged (1933 values)



Picture Story  
Of The Valley's  
1967 Hurricane

## A Souvenir Edition

ONLY  
50c

# Rio Grande Valley Newspapers

Valley Morning Star  
Harlingen, Texas

Valley Evening Monitor  
McAllen, Texas

The Brownsville Herald  
Brownsville, Texas

Friday, October 20, 1967

A SPECIAL PUBLICATION OF FREEDOM NEWSPAPERS

PRICE: 50 CENTS

Tell the story of

# BEULAH!

All day there were long lines at the grocery stores, filling stations, drug and hardware stores. Trucks, station wagons and passenger cars queued up at lumber yards where all hands were unloading huge slabs of plywood, weighing out tons of nails, piling two-by-fours in automobile trunks.

It was hard to come by a hammer, a flashlight battery or a piece of tape for the windows.

Coleman lanterns and stoves were at a premium. Kerosene lamps were in demand.

Housewives were filling bathtubs with water. Their husbands were standing outside, holding up sheets of plywood to catch the rain as it fell through the air as an instrument of death and destruction.

There was excitement but not panic. The radio gave an unending stream of information and misinformation; interviews with public officials and disaster relief personnel; and, when all else failed, newscasters interviewed each other.

Some left the Valley for San Antonio and Laredo. Some made it, some didn't. Some were worse off when they got there. But that is the end, not the beginning of the story. They couldn't get back.

The kids were having a ball. "When's it gonna come, Ma? Gee, I hope it don't miss us!"

And the news droned on: "Killer hurricane... worst ever... take all possible precautions... killer... the worst... worse than Carla... worse... killer..."

By nightfall, it was certain. There would be no miracle to send the killer into the Mexican coast. It was going to hit near the mouth of the Rio Grande.

The vigil began. By dark, the winds had begun to mount. The killer moved slowly, slowly, but accurately... right at the mouth of the Rio Grande.

On & on & on went the radio. Do this; don't do that; don't panic... Oh, God, don't panic. Please, please, please don't panic!

10 p.m. high winds. Midnight. Gales. Watch out, now. Here it comes.

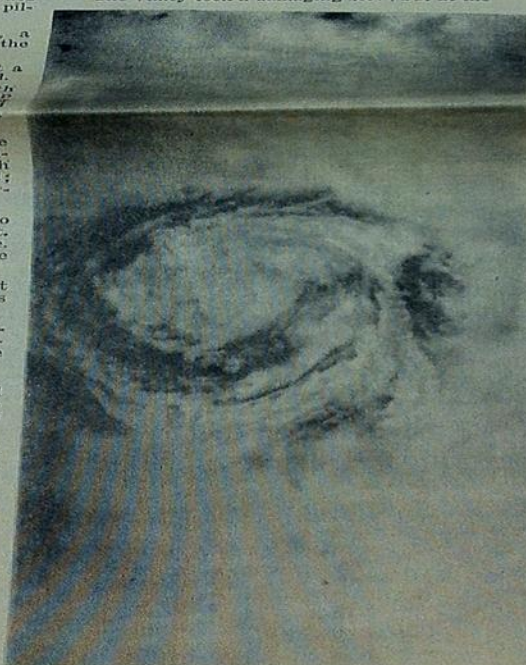
2:19 a.m. CDT, Wednesday, Sept. 20, 1967. The wind gauge at the U.S. Weather Bureau in Brownsville showed 109 miles per hour, but the actual force of Beulah remains a mystery for the wind gauge had been tilted at a 30-degree angle by the wind.

It was almost a relief. She'd been expected so long.

Still moving slowly, Hurricane Beulah skirted the coast, aimed at Corpus Christi. The center of the eye was just off-shore as Beulah struck at the mouth of the river. Then, there began a slow, agonized drift to the northwest. Northward, northward and to the west. Gradually the wind began to die

down. Finally, just south of Alice, Beulah died, turning into a rainstorm, drifting now to the southwest.

Beulah was dead. The killer had gone. The Valley took a damaging blow, but at the



## Portrait Of An Evil Woman Named Beulah

This is the way Beulah looked from an altitude of 12 miles as she hung 150 miles off the coast of Tampico, Mexico the day before she slammed into the mouth of the Rio Grande. Portrait was by Air Force plane from Scott Air Force Base, Ill.

moment, the killer had not lived up to her billing. The peak winds of 175 miles per hour had not materialized. The killer had inflicted no deaths and no serious injuries.

In the public shelters where uncounted thousands took refuge, there was qualified relief. Almost fearfully people came outside, afraid to look, but afraid not to.

What they saw startled them. Trees were uprooted. Utility lines bent to the ground or snapped. They were without power, without water, without food, and without shelter.

It took a while for the Valley to realize it: the killer had not killed anyone. In fact, damage was miraculously low for the force of the storm.

But Beulah's visitation was only now becoming apparent. The real spectre was floods.

The dying hurricane dumped 25 or more inches of rain on the Valley and nobody knows how much more on the watershed of the San Juan river in Mexico. The San Juan drains into the Rio Grande at Marte Gomez dam near Mission. Soon the water was spilling over the dam, into the already swollen Rio.

Floods became the menace. Feverishly, the Valley sandbagged, shored up its levees, prepared to fill its floodways to relieve the river. Mexico cut its levees and roadways to relieve pressure on Matamoros. It must work. There was a chance.

But then a series of miscalculations, faulty engineering or just plain fate took a hand. Maybe all three. The weir on the river, where the North Floodway joins the Arroyo Colorado, went out; and the tons of water went down the arroyo instead of entering the floodway. The waters rushed into Harlingen, flooding one of its better residential sections where water crept up to the eaves of \$75,000 homes. Business areas were in water.

Up the Valley, it was the same story. The airport in McAllen was under water. Roads went out. The Valley was isolated. Almost every up-Valley town and Raymondville in Willacy county had high water. Only Brownsville stood with dry feet. The river, drained up-stream, did not flood there.

This was Beulah's monument... millions of dollars of uninsured losses from rising water. Tons of silt and mud. A long hard job of rehabilitation ahead.

Beulah was past. She wasn't a killer, but she knew how to hurt a fellow almost to death.

Hurricane Beulah. A vicious, punishing virago. The Valley will forget her never.



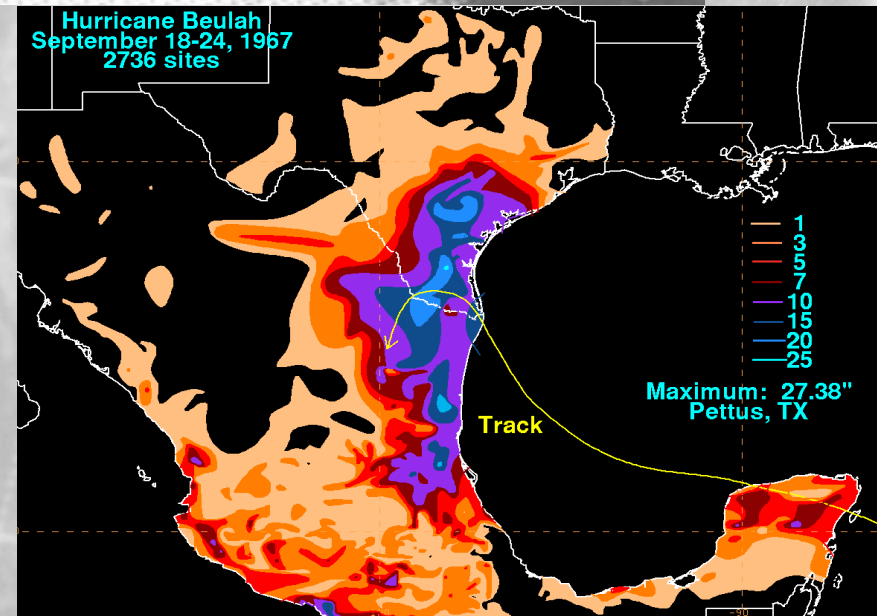
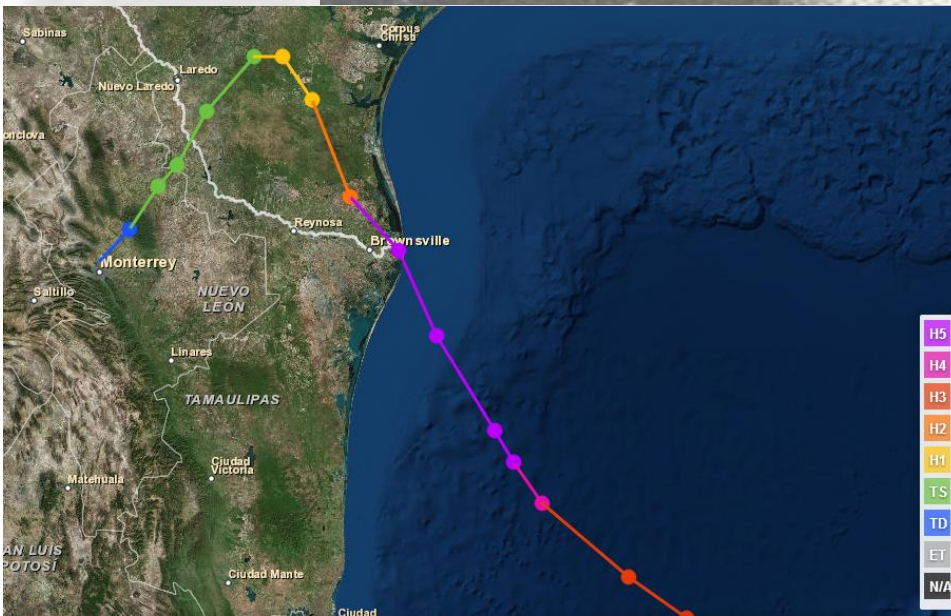
# Hurricane Beulah

Laredo

Mission

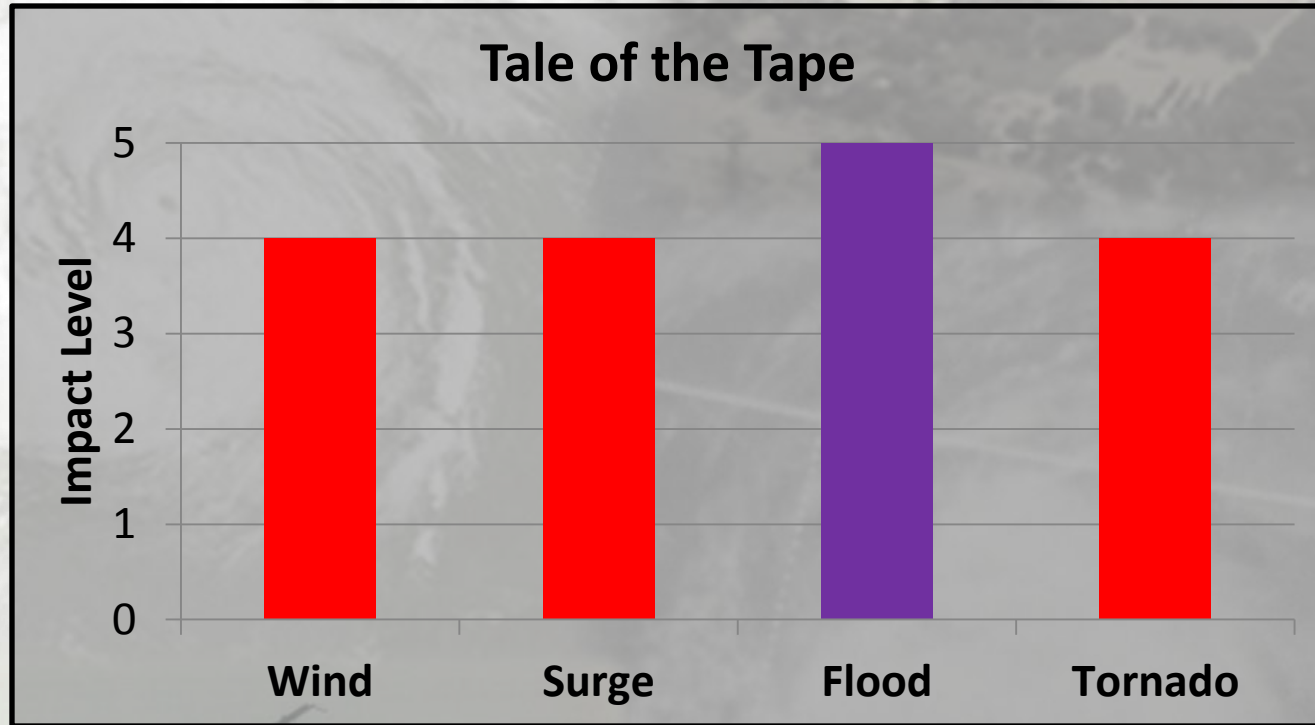
Brownsville

September 20-22, 1967





# Hurricane Beulah: Storm of Memory (1967)



## More to the Story than the Category:

- Near Coast, Storm was Category 4. When Rainfall Flooding was Worst, Category 1 and Tropical Storm.
- At time, 115 (More?) Tornadoes in South/Southeast Texas was a Record. Beulah had weakened considerably at time of deadly tornadoes.

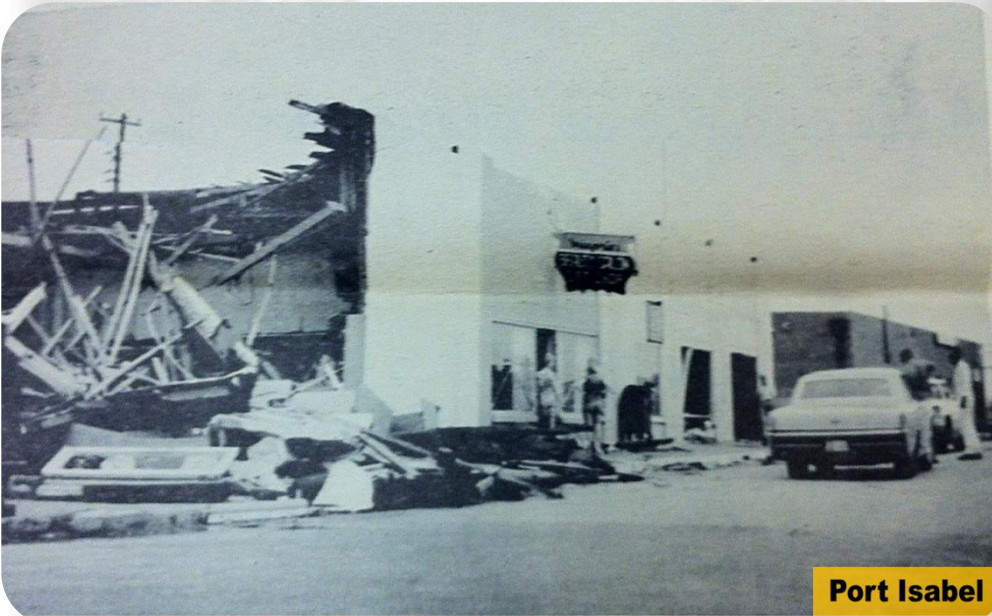
# Hurricane Beulah: Storm of Memory (1967)

- Data Features:
  - 15 to 25 inches of rainfall, widespread flooding
  - 136 mph wind gust in Port of Brownsville entry
  - 8 to 14 foot storm surge from Padre Island/Port Isabel northward; numerous cuts into Padre Island
  - 115+ tornadoes, all north of the eyewall
  - \$100 million (1967 dollars); estimated \$5-10 billion in 2015





# Hurricane Beulah: Storm of Memory (1967)



Port Isabel



Citrus blown off trees



Port of Brownsville



Boat washed ashore



# Hurricane Beulah: Storm of Memory (1967)

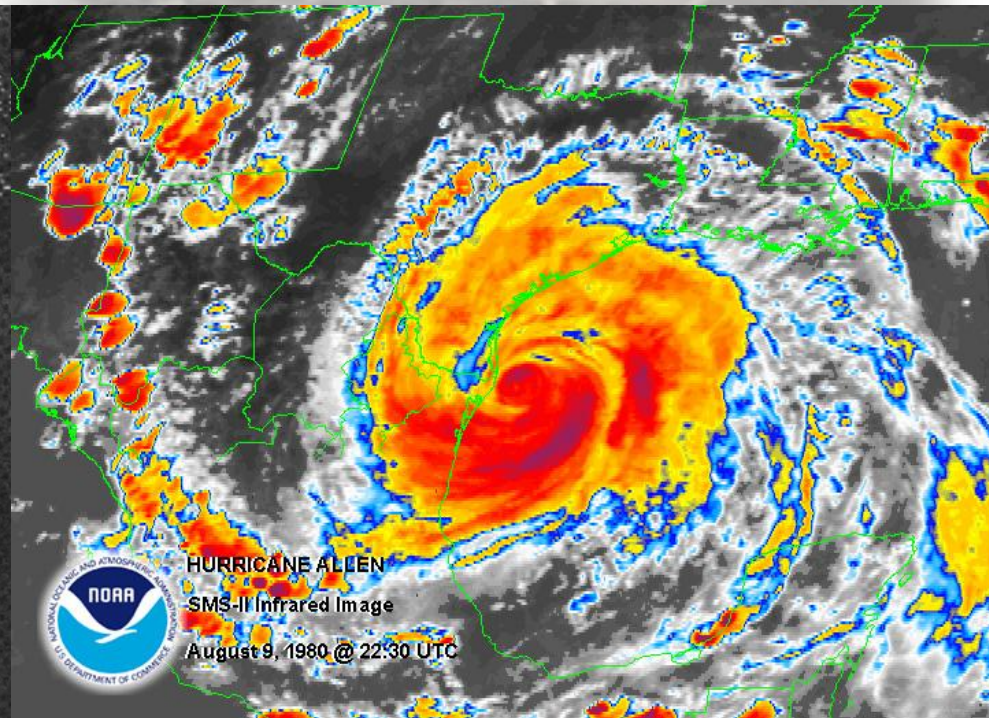
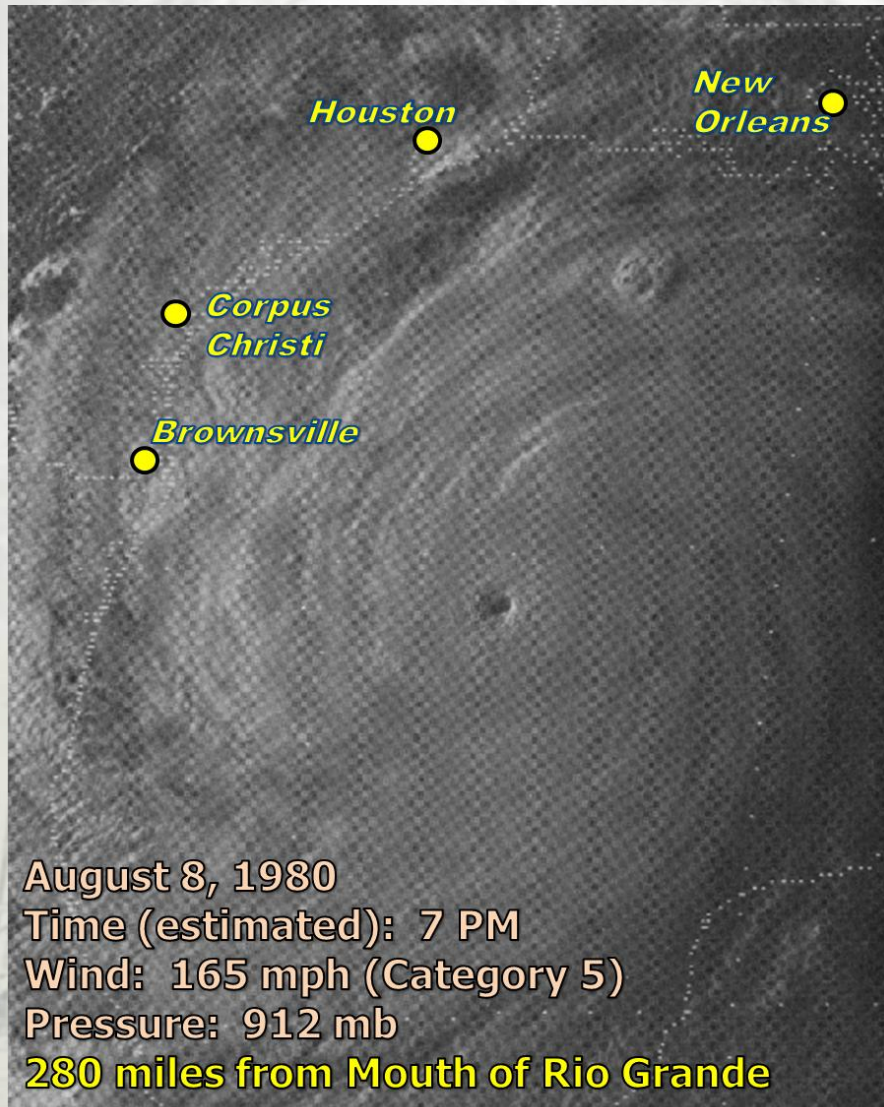
- Human Peril:
  - Hundreds Flooded Out of Homes in Harlingen, McAllen, and Starr County (right)
  - Airlifts Necessary to Bring Mexican Refugees Back Home
  - Fifteen Dead in Texas, Most from Tornadoes



Refugees return to Mexico



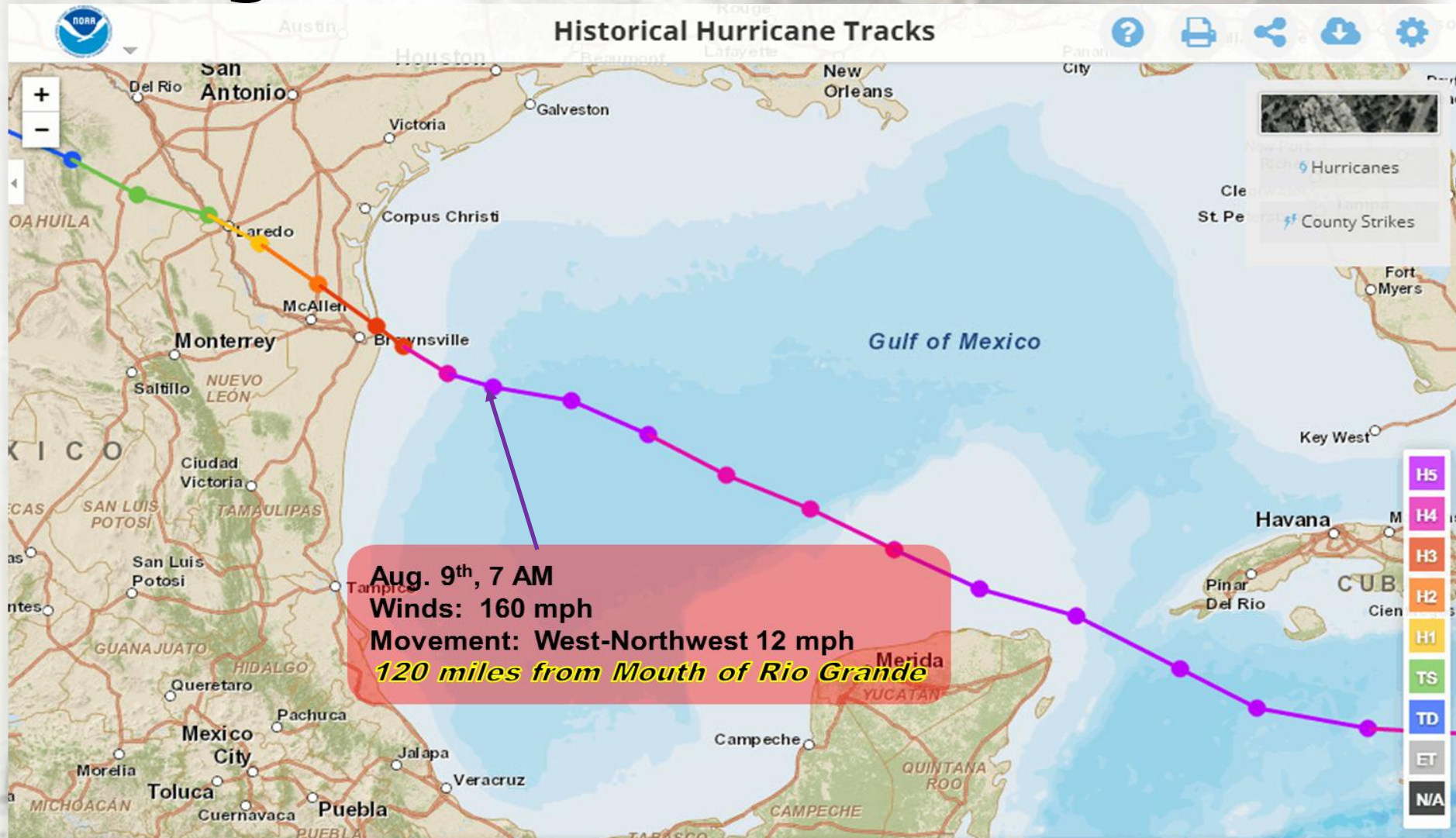
# Hurricane Allen, 1980: The Nightmare that Almost Was



August 9<sup>th</sup>, 530 PM CDT: Steady Weakening  
as Storm Slows to Crawl and Dry Air Enters  
from the West



# Hurricane Allen, 1980: The Nightmare that Almost Was



United States Department of Commerce | National Oceanic and Atmospheric Administration | National Ocean Service

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## Allen, 1980

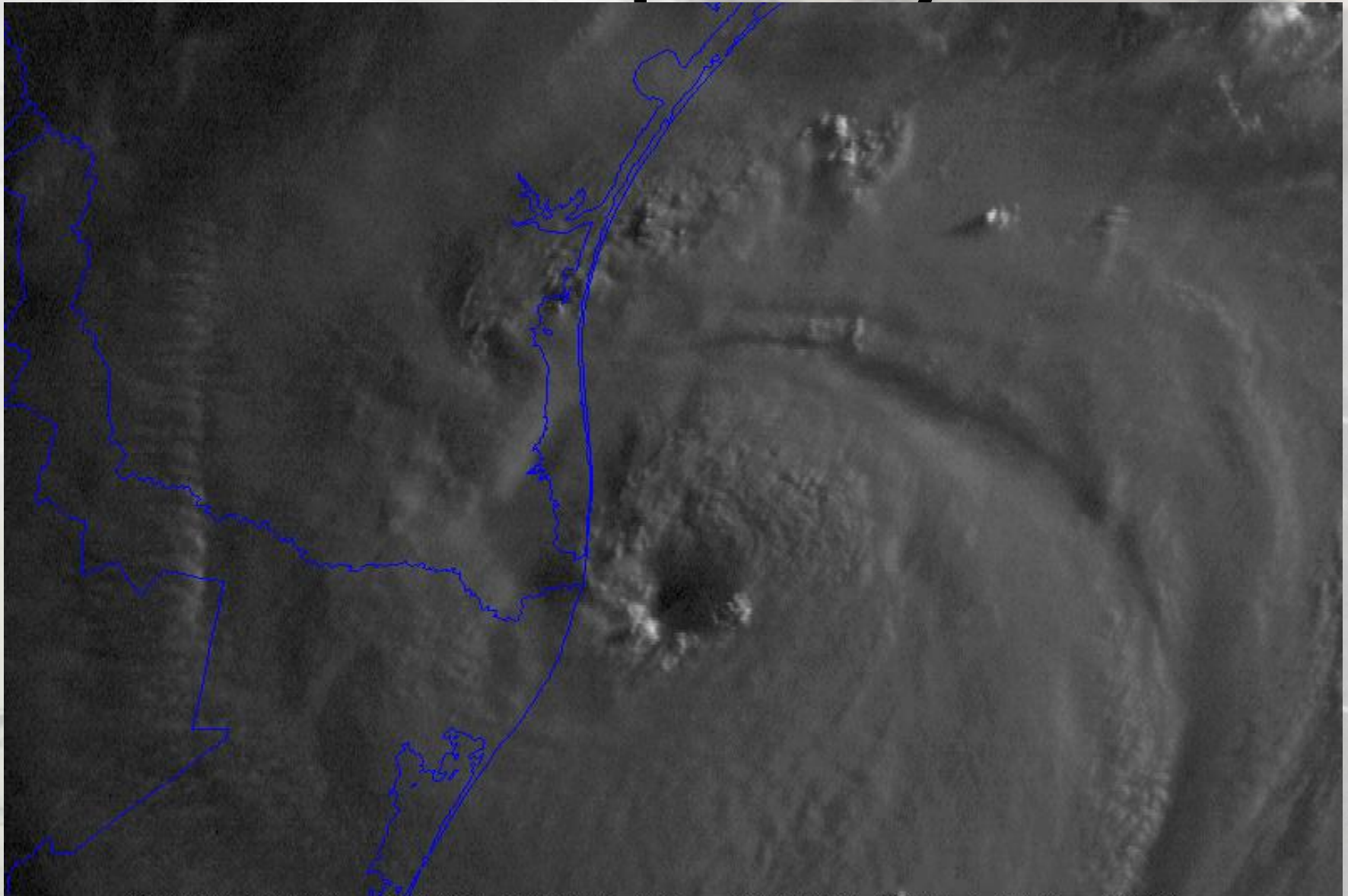
Track Shown: August 6-11



# Hurricane Allen, 1980: The Nightmare that Almost Was

- “The Storm Where Satellite Saved Lives?”
  - Estimated 200 thousand persons sought refuge inland or out of the region, nearly 40% of population at time
  - Result: Zero deaths, zero injuries in Valley
- Significant to Severe Damage in Coastal Cameron, Willacy County
  - 8-12 feet of storm tide
  - 138 mph wind gust at Port Mansfield, 78 at Brownsville
  - A foot of rain along US 281
  - Tornadoes damaged 30 homes in Brownsville
- Crop and Property Loss
  - 20% of Citrus Fruit, 40% of un-harvested cotton lost
  - Boats damaged/destroyed from Port Isabel to Port Mansfield
  - Estimated \$100 million (1980 dollars); would be close to \$1 billion today

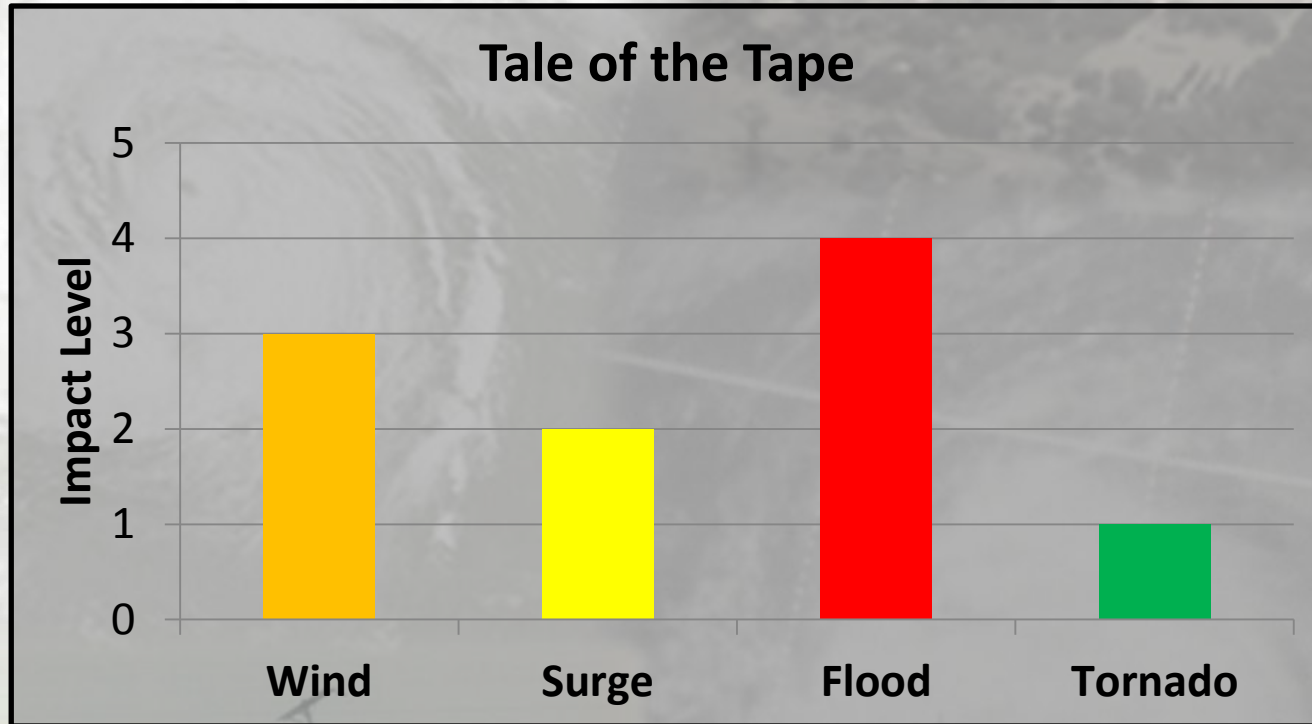
# 21<sup>st</sup> Century: Dolly Snaps Valley Out of Complacency



GOES-12 IMAGER - VISIBLE (CHANNEL 01) - 12:15 UTC 23 JULY 2008 - CIMSS



# 21<sup>st</sup> Century: Dolly Snaps Valley Out of Complacency



## More to the Story than the Category:

- Wind was Predominantly Category 1...but lasted for six hours in spots, increasing damage
- Flooding was significant and widespread, while storm was weakening to Tropical Storm Strength

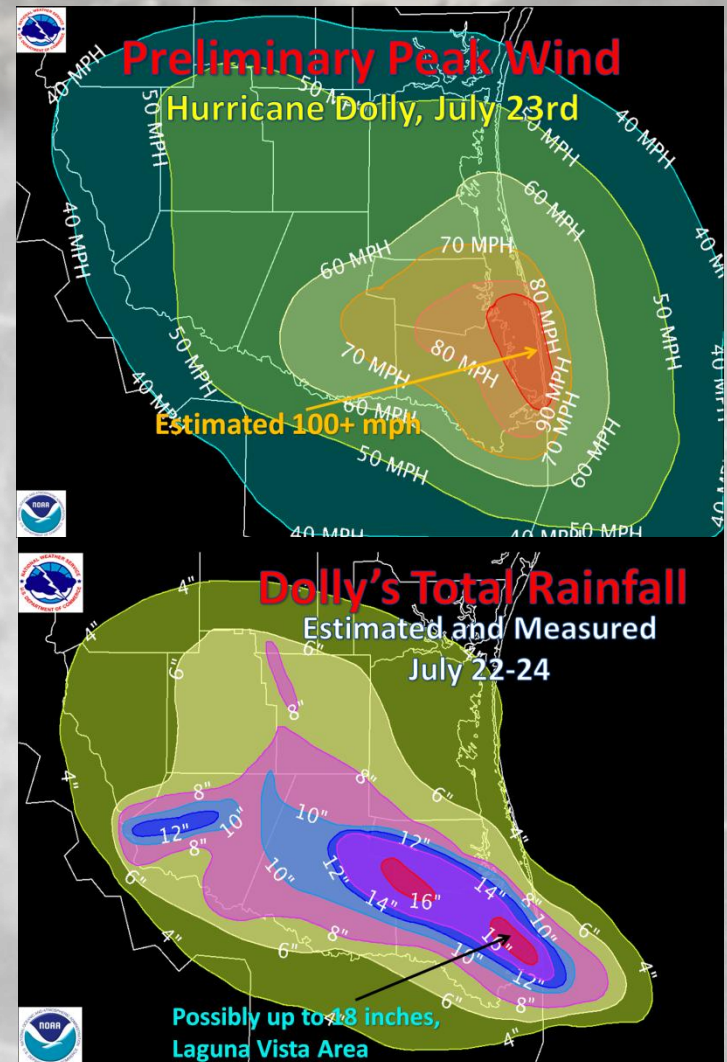
# 21<sup>st</sup> Century: Dolly Snaps Valley Out of Complacency





# 21<sup>st</sup> Century: Dolly Snaps Valley Out of Complacency

- Wind Damage Estimated at \$1.05 Billion
- Flood Damage Likely the Same
  - Unknown due to lack of insurance coverage of up to 90% of those impacted
  - Estimated total (2008 dollars) \$2.10 Billion
- Rare July Storm for Region
  - Effectively “Killed Off” the Peak Summer Beach Season; combined with recession, a number of businesses closed

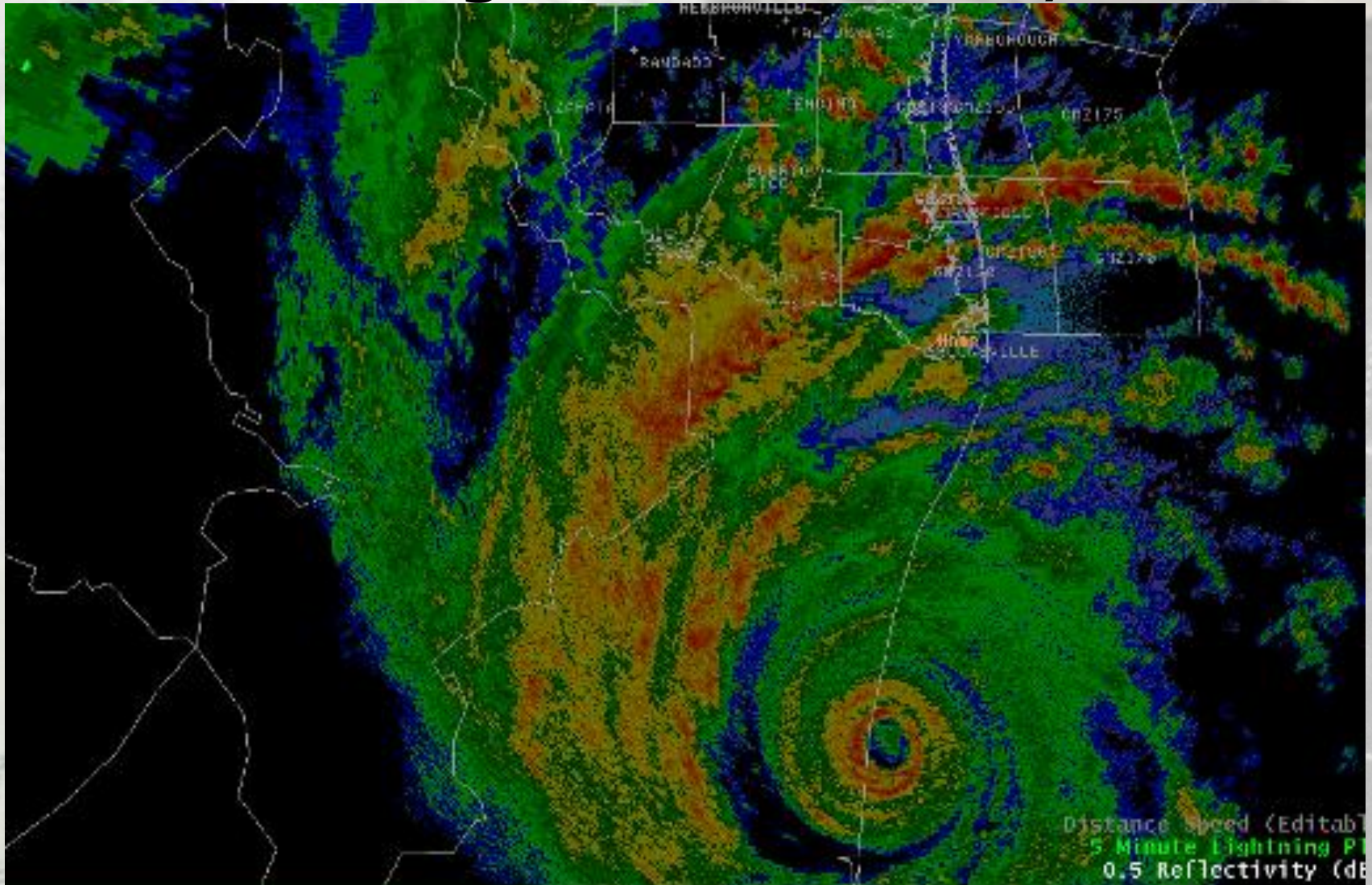


# Dolly/Beulah Comparison

Hazard	Dolly	Beulah
Wind	75G90-100 landfall, 40-60G60-80 Cameron inland	110G135 landfall, gusts up to 100 to Edinburg/Pharr, 109+ Brownsville Arpt.
Storm Surge	2 to 4 ft (3 to 5 ft tide); worst from bayside	5 to 8 ft Town SPI across Laguna; 8-14 ft+ Padre Island seashore
Flooding	12 to 18+ inches of rain; widespread areal flooding	Locally 24+ inch rain, flood control failures on Rio Grande
Tornadoes	1 thin tornado reported, no damage	1 tornado RGV, 117 tornadoes w/damage and deaths S TX



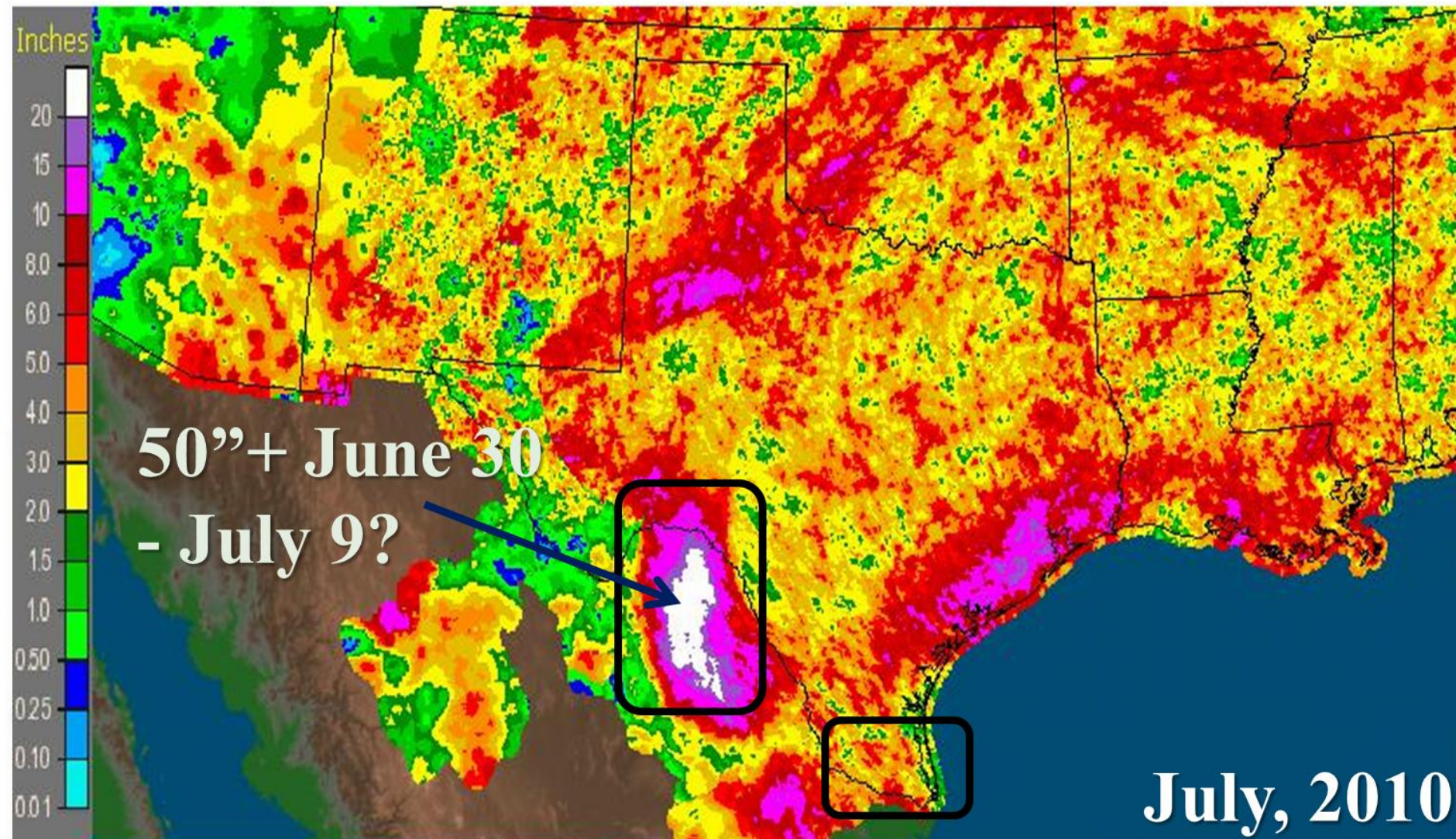
# 21<sup>st</sup> Century: It Doesn't Take a Direct Hit to Cause a Big Problem – Alex, 2010





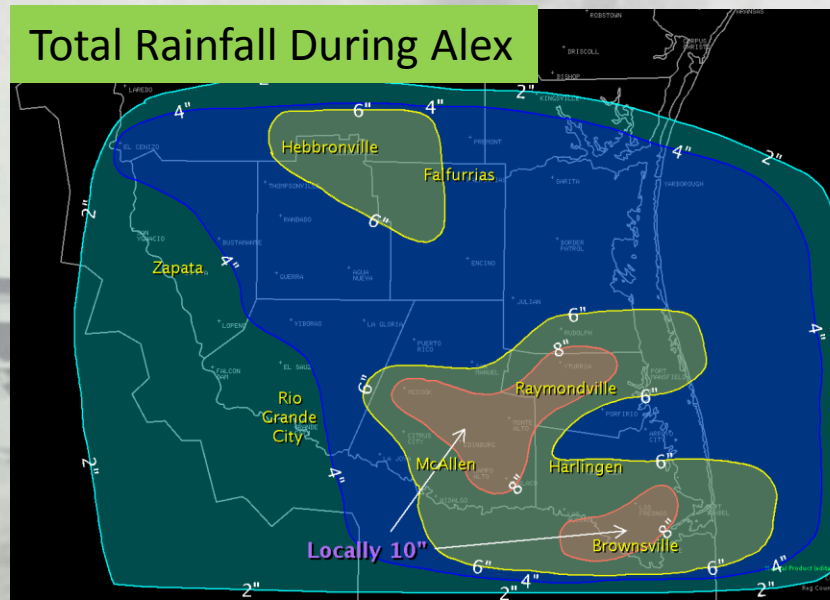
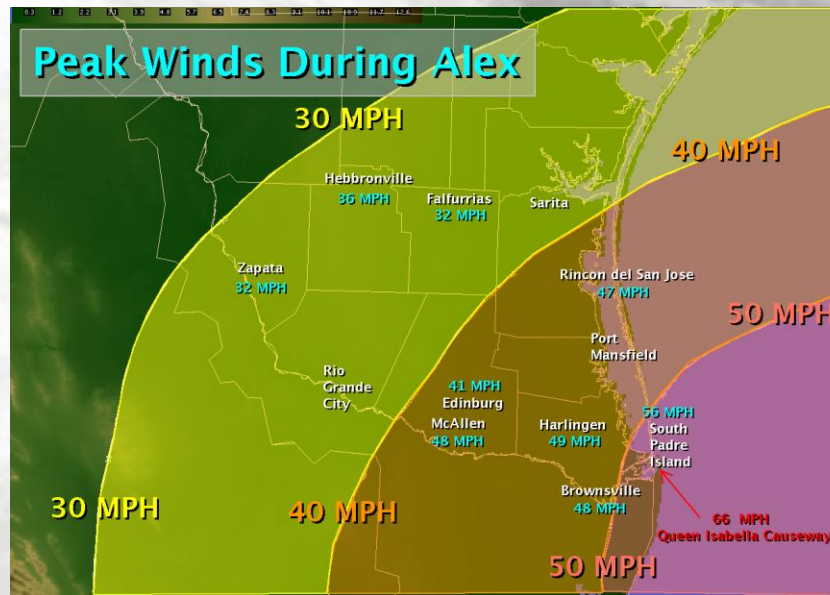
# 21<sup>st</sup> Century: It Doesn't Take a Direct Hit to Cause a Big Concern – Alex, 2010

Texas: July, 2010 Monthly Observed Precipitation  
Valid at 8/1/2010 1200 UTC– Created 8/3/10 21:39 UTC





# 21<sup>st</sup> Century: It Doesn't Take a Direct Hit to Cause a Big Concern – Alex, 2010



# 21<sup>st</sup> Century: It Doesn't Take a Direct Hit to Cause a Big Concern – Alex, 2010



Valley Morning Star





## **21<sup>st</sup> Century: It Doesn't Take a Direct Hit to Cause a Big Concern – Alex, 2010**

- Both Falcon and Amistad Had to Release Millions of Gallons
  - Downstream Flooding “forced” in non-levee protected Rio Grande (Starr, SW Hidalgo)
  - \$100+ million in crop and property damage inside levee or unprotected areas
  - One fatality (man drove into floodway late at night)
  - Controlled flows continued through October, four months after causative event
- For RGV, winds never reached hurricane force
- For RGV, rainfall flooding was generally “nuisance” and short lived
- One EF1 tornado occurred in Deep S. Texas, a full day after landfall; \$5 million in damage.

# What Concerns Us Most Moving Forward?



## **South Padre Island (left):**

- **Tens of Millions in Tourist Business, Potential for Huge Property Loss**
- **Much has been built after Allen in 1980, the last large storm surge event**

## **Port of Brownsville (right):**

- **\$1 billion (+) in heavy industry, more to come**
  - **Steel and Ship-breaking**
  - **LNG (future??)**



# **What Concerns Us Most Moving Forward? ...Or, What Keeps Me Up At Night**

<b>Year</b>	<b>RGV Population</b>
<b>1900</b>	<b>34,401</b>
<b>1920</b>	<b>85,861</b>
<b>1940</b>	<b>215,803</b>
<b>1960</b>	<b>369,223</b>
<b>1980</b>	<b>537,717</b>
<b>2000</b>	<b>978,369</b>
<b>2020(?)</b>	<b>1,700,000(?)</b>

- **More People = More Stuff = More Property Damage**
- **Will Roads Be Able to Handle Evacuation?**
- **Will Residents Be Aware of Ability to Shelter in Place**
  - **Flood zone, Wind Protection, etc.**
- **What About Cross-Border Evacuation?**
- **Will Family Ties, Culture Work in 2015-2020 as well as they did in 1980?**

# Messaging, Awareness and Preparedness With the Unique Culture of the Rio Grande Valley Are the Keys to Success!

Contact:

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956-572-1492

<http://weather.gov/rgv>

